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clature, to express an opinion upon the first use of the word "genotype." He writes, January 30, as follows:

I can not give the date of the first introduction of this word to replace the phrase "generic type," but I find it was used as early as 1903, as apparently a word not new. By 1905 it was in common use in discussions of generic types and prior to 1910 it became officially adopted by the International Zoological Commission. I think the first use of the word was by some writer in *Nature* or in the *Annals and Magazine of Natural History*.

The word is derived from the Greek word *γένος* = kind, genus and *τύπος* = type. The use of "o" as a connecting vowel seems to be consistent with general usage in such cases. The derivation of "genetic" is given in the Century Dictionary as from *γένεσις* = generation, genesis.

I will try to trace it to its origin, and, if successful, report again on the subject.

This note by Dr. Allen raises the question as to the use of "o" as the connecting vowel in the term "genotype" proposed by Johannsen. Why not use "e" as the connecting vowel, as in genetic, genesis, etc.? This would obviate the confusion which is bound to arise and persist if the preoccupied term "genotype" is adhered to. It is such a valuable conception of Professor Johannsen's that it seems worth while to have a permanent and undisputed designation for it.

HENRY FAIRFIELD OSBORN

AMERICAN MUSEUM,  
February 7, 1912

#### SCIENTIFIC BOOKS

*Grundzüge der Palæobiologie der Wirbelthiere.*

By O. ABEL, Professor of Paleontology in the University of Vienna. Stuttgart, E. Schweizerbart. 1912. Pp. xii + 708, frontispiece and 470 text illustrations.

This extremely interesting and highly important treatise is in effect a text-book of adaptation among the vertebrates past and present. The subject is, as Doctor Abel observes, the most recent development of paleontologic science. Speculations, indeed, on the habits and environment of extinct animals are as old as the first finding of their fossil re-

mains. But the systematic study of the subject, analysis of the adaptive characters of living animals and interpretation of the adaptation of extinct animals, is a development of the last few years. It requires as its groundwork thorough morphologic study of complete skeletons, which until recent years have been very rarely available among fossils.

The subject is a fascinating one—somewhat speculative in the present stage of its development, for the criteria of adaptation are not yet perfectly worked out or thoroughly tested. But it lends to these dry bones a living interest that a systematic treatment lacks, and a faunal or even a phylogenetic treatment imperfectly supplies. Doctor Abel has given particular attention to this phase of paleontology and his work is authoritative, especially in the field of marine adaptations. The subject is clearly presented and well illustrated.

The volume opens with a sketch of the development of paleontologic method. Then follows a discussion of the causes, conditions and processes of fossilization. The principal portion is devoted to the various adaptations of vertebrates, especially of fossil vertebrates as interpreted by modern adaptations, and a full discussion of the criteria of adaptation in external form and in construction of feet, teeth and other parts. A final chapter discusses the relations of paleobiology and phylogeny.

The analyses of the various adaptive types with their parallel and divergent characters are admirably clear and serve to bring together the latest results of studies in *ethology*, as the study of adaptation is called by Dollo. The illustrations are numerous, well chosen and instructive.

The entire volume is surprisingly free from errors of fact—such criticisms as may be made are in matters of interpretation and theory. Doctor Abel is perhaps a little prone at times to accept the theoretical conclusions of others without sufficient critical sifting of the evidence, and here and there one finds difficulties in reconciling conclusions which in truth are based upon mutually exclusive data.

The volume is crowded with novel sugges-

tions and interpretations of adaptation of various extinct races. Most of them will be welcomed and accepted; some may need further consideration; a few seem open to serious criticism. The discussion of the carnassial teeth of carnivora ignores their most essential feature, the shearing adaptation. The hypothesis that the inner digit of the fore foot in amphibia is primarily absent, and its presence in reptilia and mammalia is a "neuerwerbung," will not commend itself to many; nor will the interpretation of the Stegocephalia and Cotylosauria as fossorial adaptations be readily reconciled with the strikingly paddle-like construction of the feet in these animals, especially the former. But these and a few other points are occasional lapses from the normally high standard of thorough and up-to-date information and good judgment. The book will rank as one of the most important and readable contributions to paleontologic literature, and be indispensable to every one who wishes to understand and teach the real meaning of extinct animals and their relations to the world in which they lived.

W. D. MATTHEW

*Inheritance in Maize.* By E. M. EAST and H. K. HAYES.

This is an interesting and important contribution from the Bussey Institution of Harvard University, which has appeared as Bulletin 167 of the Connecticut Agricultural Experiment Station. It presents a very thorough study from the Mendelian standpoint of a number of characters of the Indian corn plant and their method of transmission. The interest in this study, however, is by no means confined to its connection with the improvement of this, our greatest agricultural crop, for many of the principles involved have a significant bearing upon several of the more general problems of heredity.

The bulletin, embracing as it does so many different considerations, scarcely admits of a summary that would be short and at the same time intelligible. It is the present purpose, therefore, merely to indicate the general plan and scope of the work by mentioning briefly a

few of the many interesting points touched upon.

After a short introduction in which the authors point out the advantages and disadvantages offered by the maize plant as material for study of genetics, the subject is conveniently divided into five parts.

In Part I. is presented the *material and the problem*, and the corn plant, *Zea mays*, is considered in its systematic relationships. Different classifications are considered, but the well-known one of Sturtevant, slightly modified, is finally adopted as being the most practical and convenient. In this connection there is some speculation in regard to the origin of maize based upon the facts brought out in the investigation concerning the transmission of its characters. After reviewing briefly some of the theories proposed by other authors the suggestion is here offered that maize is derived from teosinte or some similar plant. The maize ear represents an evolutionary product derived by progressive meristic variation of the central spike of the lateral tassels of the teosinte. Other changes are to be accounted for in the accession or dropping of characters, the transmission being in accordance with Mendel's principles.

Mention is then made of the work of previous investigators of inheritance in maize. It is interesting to note how very close some of these workers were, in the days of the eighties and nineties, to the rediscovery of Mendel's law, yet failed to recognize its operation in their results. It is also interesting to note that *Zea mays* is the plant that furnished the data which finally did lead to the rediscovery of the law on the part of both de Vries and Correns.

Next follows a catalogue description in detail of each of the twenty-nine ears of corn that formed the parentage of the various hybrid combinations used in this investigation. Experimental methods and precautions are described. Very much of the value of this report depends upon the painstaking care with which the investigation was carried out, as for example, the previous inbreeding of all the stock used, in order to establish purity. An-